

## LABORATORY STUDY OF THE FEEDING BEHAVIOR OF COCHLIOMYIA HOMINIVORAX (COQUEREL, 1858) (DIPTERA: CALLIPHORIDAE) ON VARIOUS DIETS

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### ABSTRACT

The New World screw worm *Cochliomyia hominivorax* (Coquerel, 1858) (Diptera: Calliphoridae) is a human parasite during its larval stage. The aim of this study was to determine the feeding behavior and food preference of the screw worm larva. This study was conducted in the research laboratory of Sattam Bin Abdul-Aziz University, College of Science and Humanities. The results include the one concentration of the food medium tested (five g) showed that the larvae preferred the diets: chicken meat, lamb heart, cat food, and beef meat. We found a clear relationship between larval growth and the quantity of food in the growth media. Mean weight(ml/g) was increased at the preferred diets in the order: chicken meat 0.04 (mg)> lamb heart 0.01(mg) > cat food 0.008 (mg)> beef meat 0.007(mg).

**KEYWORDS:** Myiasis, Larval Growth, Preference Food & Parasitism

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### INTRODUCTION

The term myiasis was first proposed by Hope (1840) to refer to diseases of humans originating specifically due to dipterous larvae as opposed to those caused by insect larvae in general, known as scholichiasis (Kirby & Spence, 1815). Hope presented a table of myiasis cases that included several cases from Jamaica caused by an unknown larva, one of which resulted in death. Some larvae were described as those of an unidentified blue fly. These cases are almost certainly early references to myiasis caused by the New World screw worm *Cochliomyia hominivorax* (Coquerel, 1858) (Diptera: Calliphoridae) Bharti (2009).

Myiasis has since been defined as “the infestation of live vertebrate animals with dipterous larvae, which, at least for a certain period, feed on the host’s dead or living tissue, liquid body substances, or ingested food” (Zumpt, 1965). Myiasis can be categorized as anatomically, in relation to the location of the infestation on the host, or according to the parasite’s level of dependence on the host. The anatomical system of classification was first proposed by Patton (1922) and later modified by James (1947). However, Patton (1922) found this system to be unsatisfactory when considering the evolutionary and biological relationships, because individual species could be assigned to more than one group, and different groups contained species with different levels of dependence on the host. Instead, he put forward a system based on the degree of parasitism shown by the fly.

The anatomical system is useful for practical diagnosis (Zumpt, 1965); therefore, we have used this system in our study. In this study, we aimed to determine the feeding behavior and diets preference of the *C. hominivorax* larvae.

## MATERIAL AND METHODS

### 1. 1. Insects

The insects used in the series of experiments were larvae >24 h (h) old Augul et al (2009). were taken from a laboratory colony of the New World screw worm *Cochliomyia hominivorax* (Coquerel,1858) (Diptera: Calliphoridae) initially collected from infected lamb meat in 2020 and maintained at the research laboratory of Sattam Bin Abdul-Aziz University, College of Science and Humanities

### 1. 2. Experimental Procedures

Meat selected to be the basis of the food products identified in this study are chicken meat, beef, cat food, lamb heart. It consists of minced meat and/or lamb hart, liquid blood added to anticoagulant substance, distilled water formalin. Prepare the food medium. Mix the ingredients of the food medium in the proportions specified above and in a good way in glass containers of suitable sizes. Place the bowls in a water bath to raise the temperature of the food medium to 37 degrees Celsius. Food with a temperature of 37 to Petri dishes 30 cm diameter and 10 cm deep. These food environments are provided at a concentration of 5 grams per food medium Each medium had four replicates.

The study was conducted in two experiments:

### 2. Quantity of the Food Media Consumed

In the first experiment, we assessed the quantity of food media consumed 24 h old at the beginning of the larval transformation stage of 50 larvae distributed on 10 Petri dishes. The following observations were made daily: quantity of food media consumed and larval weight.

### 3. Larval Feeding Behavior on the Selected Food Media

In the second experiment, we evaluated the larval feeding behavior by observing 160 larvae 24 h old. The larvae were distributed in 16 Petri dishes (10 larvae/dish). The following observations were made daily to measure sensitivity balance.

Statistical analysis: statistical analysis was performed using the program SAS (Institute Inc (1988), (Cary,NC,USA), data were analyzed statistically by using One-ways analysis of variance (ANOVA).

## RESULTS AND DISCUSSIONS

### 1. Consumption of the Food Media

#### a. Daily Larval Weights

The results of the daily larval weights are listed in Table 1. Data reveled significant effects ( $p<0.05$ ) of larval weight for the four-food medium:  $F_{2,6} = 274.3$ ,  $F_{2,6} = 253.3$ ,  $F_{2,6} = 234.3$ ,  $F_{2,6} = 122.2$  for chicken meat, lamb heart, cat food, beef meat.

Mean larval weight(ml/g) was increased at the preferred diets in the order: chicken meat 0.04 (mg)> lamb heart 0.01(mg) > cat food 0.008 (mg)> beef meat 0.007(mg).

#### b. Consumption of the Food Media

From the data shown in Table 1, one larva consumed an average of 0.04, 0.01, 0.008, and 0.007 mg of chicken meat, lamb heart, beef meat, and cat food, respectively. This showed that the favorite food media was chicken meat and lamb heart and

explains the increase in larval weight. Furthermore, the preferred food media can be used as a model food medium for myiasis. The different behavior toward the food media may be owing to the differences in nutritional composition of the media (Hogsette, 1992). Our results are consistent with the different feeding behaviors of larvae reported by Morgan (1986) and Bailey et al. (1975). We recommend the use of chicken meat and lamb heart for breeding *C. hominivorax* .

**Table 1: Quantity of Food Media Consumed and Weight of *Cochliomyia Hominivorax* Larvae**

Food Media	Food Media Consumed	Larval Weight (mg)
Chicken meat	0.4	0.001
lamb heart	0.01	0.007
Beef meat	0.008	0.004
Cat food	0.007	0.0008

## REFERENCES

1. Augul, R. S., & Jassim, S. Y. (2009). *Study of some biological and ecological aspects of the fly Chrysomya albiceps* (Wiedemann, 1819) (Diptera: Calliphoridae). *Journal of University of Anbar for Pure Science*, 3, 1–4.
2. Bailey, D. L., Whitfield, T. L., & LaBrecque, G. C. (1975). *Laboratory biology and techniques for mass producing the stable fly, Stomoxys calcitrans* (L.) (Diptera: Muscidae). *Journal of Medical Entomology*, 12, 189–193.
3. Bharti, M. (2009). *Some notes on medically important flies* (Diptera: Calliphoridae) from India. *Halteres*, 1, 66–71.
4. Hogsette., A. J. (1992). *New diets for production of house flies and stable flies* (Diptera: Muscidae) in the laboratory. *Journal of Economic Entomology*, 85, 2291–2294.
5. Hope, F.W. (1840) *On Insects and Their Larvae Occasionally Found in the Human Body*. *Transactions of the Entomological Society of London*, 2, 256-271.
6. James MT (1947) *The flies that cause myiasis in man*. *Miscellaneous Publication No 631. US Dept of Agriculture, Washington DC*, pp 1–175.
7. Morgan, P. P. (1986). *Mass culturing microhymenopteran pupal parasites* (Hymenoptera: Pteromalidae) of filth breeding flies. *Miscellaneous Publications of the Entomological Society of America*, 61, 77–87.
8. Patton WS (1921-1922) *Some notes on Indian Calliphorinae. Part VII. Additional cases of myiasis caused by larvae of Chrysomya bezziana* Vill. together with some notes of the Diptera which cause myiasis in man and animals. *Indian J Med Res* 9: 654–682
9. SAS Institute Inc., 1988. *SAS/STAT User's Guide, release 6.03 Edition*. Cary, NC.
10. Zumpt F. 1965. *Myiasis in man and animals in the Old World*. Butter-worth's, London, United Kingdom.
11. LakshmiKantham, V., and D. Bharathi. "Impact of Plant Growth Hormone, Indole-3-Acetic Acid (Iaa) on the Organic Constituents of Silkworm, *Bombyx Mori* L." *International Journal of Agricultural Science and Research (IJASR)* 4.5 (2014): 37-44.
12. Saxena, Sonika. "Effect of Zinc Sulphate on Growth and Development in Tadpoles of Toad *Bufo Fergusonii*." *International Journal of Zoology and Research (IJZR)* ISSN(P): 2278-8816;ISSN(E): 2278-8824 Vol. 6.2, Apr 2016, 1-6
13. Kulkarni, N. V., R. Kataria, and S. Gupta. "Evaluation of various oils on Khapra beetle, *Trogoderma granarium* Everts (Coleoptera: Dermestidae) in terms of survival of adulthood, grain damage and population build-up." *Int. J. Agric. Sci. Res* 5 (2015): 2250-2257.

14. Dindor, M. U., et al. "Screening of maize cultivar for resistance to maize stem borer, *Chilo partellus*." *International Journal of Agricultural Science and Research* 6.5 (2016): 233-242.